

## AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

### Listing of Claims:

- 1        1. (Original Claim) A method for generating code to perform  
2 anticipatory prefetching for data references, comprising:  
3            receiving code to be executed on a computer system;  
4            analyzing the code to identify data references to be prefetched; and  
5            inserting prefetch instructions into the code in advance of the identified  
6 data references, wherein inserting the prefetch instructions involves,  
7                    attempting to calculate a stride value for a given data  
8                    reference within a loop,  
9                    if the stride value cannot be calculated, setting the stride value to a default  
10          stride value, and  
11            inserting a prefetch instruction to prefetch the given data reference for a  
12          subsequent loop iteration based on the stride value;  
13            wherein the stride value is constant for some (but not necessarily all) loop  
14          iterations.

- 1        2. (Original Claim) The method of claim 1, further comprising  
2 allowing a system user to specify the default stride value.

- 1        3. (Original Claim) The method of claim 1, wherein calculating the  
2 stride value involves:  
3            identifying an induction variable for the stride value;

4 identifying a stride function for the stride value; and  
5 calculating the stride value based upon the stride function and the  
6 induction variable.

1 4. (Original Claim) The method of claim 1, wherein inserting the  
2 prefetch instruction based on the stride value involves:  
3 calculating a prefetch cover distance by dividing a cache line size by the  
4 stride value;  
5 calculating a prefetch ahead distance as a function of a prefetch latency,  
6 the prefetch cover distance and an execution time of a loop; and  
7 calculating a prefetch address by multiplying the stride value by the  
8 prefetch cover distance and the prefetch ahead distance and adding the result to an  
9 address accessed by the given data reference.

1 5. (Original Claim) The method of claim 1, wherein analyzing the  
2 code involves:  
3 identifying loop bodies within the code; and  
4 identifying data references to be prefetched from within the loop bodies.

1 6. (Original Claim) The method of claim 5, wherein analyzing the  
2 code to identify data references to be prefetched involves examining a pattern of  
3 data references over multiple loop iterations.

1 7. (Original Claim) The method of claim 1, wherein analyzing the  
2 code involves analyzing the code within a compiler.

1 8. (Original Claim) A computer-readable storage medium storing  
2 instructions that when executed by a computer cause the computer to perform a

3       method for generating code to perform anticipatory prefetching for data  
4       references, the method comprising:  
5           receiving code to be executed on a computer system;  
6           analyzing the code to identify data references to be prefetched; and  
7           inserting prefetch instructions into the code in advance of the identified  
8       data references, wherein inserting the prefetch instructions involves,  
9               attempting to calculate a stride value for a given data  
10          reference within a loop,  
11               if the stride value cannot be calculated, setting the stride  
12          value to a default stride value, and  
13          inserting a prefetch instruction to prefetch the given data reference for a  
14          subsequent loop iteration based on the stride value;  
15          wherein the stride value is constant for some (but not necessarily all) loop  
16          iterations.

1           9.       (Original Claim) The computer-readable storage medium of claim  
2       8, wherein the method further comprises allowing a system user to specify the  
3       default stride value.

1           10.      (Original Claim) The computer-readable storage medium of claim  
2       8, wherein calculating the stride value involves:  
3               identifying an induction variable for the stride value;  
4               identifying a stride function for the stride value; and  
5               calculating the stride value based upon the stride function and the  
6       induction variable.

1           11.      (Original Claim) The computer-readable storage medium of claim  
2       8, wherein inserting the prefetch instruction based on the stride value involves:

3           calculating a prefetch cover distance by dividing a cache line size by the  
4   stride value;  
5           calculating a prefetch ahead distance as a function of a prefetch latency,  
6   the prefetch cover distance and an execution time of a loop; and  
7           calculating a prefetch address by multiplying the stride value by the  
8   prefetch cover distance and the prefetch ahead distance and adding the result to an  
9   address accessed by the given data reference.

1           12. (Original Claim) The computer-readable storage medium of claim  
2   8, wherein analyzing the code involves analyzing the code within a compiler.

1           13. (Original Claim) An apparatus that generates code to perform  
2   anticipatory prefetching for data references, comprising:  
3           a receiving mechanism that is configured to receive code to be executed on  
4   a computer system;  
5           an analysis mechanism that is configured to analyze the code to identify  
6   data references to be prefetched; and  
7           an insertion mechanism that is configured to insert prefetch instructions  
8   into the code in advance of the identified data references;  
9           wherein the insertion mechanism is configured to,  
10              attempt to calculate a stride value for a given data reference  
11              within a loop,  
12              set the stride value to a default stride value if the stride  
13              value cannot be calculated, and to  
14              insert a prefetch instruction to prefetch the given data  
15              reference for a subsequent loop iteration based on the stride value;  
16           wherein the stride value is constant for some (but not necessarily all) loop  
17           iterations.

1           14. (Original Claim) The apparatus of claim 13, further comprising a  
2 configuration mechanism that is configured to receive the default stride value  
3 from a system user.

1           15. (Original Claim) The apparatus of claim 13, wherein while  
2 calculating the stride value, the insertion mechanism is configured to:  
3           identify an induction variable for the stride value;  
4           identify a stride function for the stride value; and to  
5           calculate the stride value based upon the stride function and the induction  
6 variable.

1           16. (Original Claim) The apparatus of claim 13, wherein the insertion  
2 mechanism is configured to:  
3           calculate a prefetch cover distance by dividing a cache line size by the  
4 stride value;  
5           calculate a prefetch ahead distance as a function of a prefetch latency, the  
6 prefetch cover distance and an execution time of a loop; and to  
7           calculate a prefetch address by multiplying the stride value by the prefetch  
8 cover distance and the prefetch ahead distance and adding the result to an address  
9 accessed by the given data reference.

1           17. (Original Claim) The apparatus of claim 13, wherein the apparatus  
2 resides within a compiler.

1           18. (Canceled).

1           19. (Canceled).

1           20.     (Canceled).

1           21.     (Canceled).

1           22.     (Canceled).

1           23.     (Canceled).

1           24.     (Canceled).

1           25.     (Canceled).

1           26.     (Canceled).

1           27.     (Canceled).

1           28.     (Canceled).

1           29.     (Canceled).

1           30.     (Canceled).

1           31.     (Canceled).

1           32.     (Canceled).

1           33.     (Canceled).

1           34.     (Canceled).

1           35.     (Canceled).

1           36.     (Canceled).

1           37.     (Canceled).

1           38.     (Canceled).

1           39.     (Canceled).

1           40.     (Canceled).

1           41.     (Canceled).

1           42.     (Canceled).

1           43.     (Canceled).

1           44.     (Canceled).

1           45.     (Canceled).